Industrial Finishing

Reg. U. S. Pat. Off.

An Independent Publication Devoted to the Finishing of Industrial Products

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Letters

Buffs Wanted

In the April issue you have an article on rubbing, polishing and buffing mechanically in place of the present hand rub. This article appears on page 17; but you offer no means of finding out how the buffs, such as those being used in this operation, can be purchased.

Please send us all information you possibly can get on rubbing and polishing wood finishes and also where such buffs could be purchased.—C. C. C. (Band Instruments)

Automatic Striper Wanted

We are interested in becoming acquainted with mechanical striping equipment suitable for striping turned wood handles. The handles will be dipped with a green paint and will require a white or ivory stripe around the entire circumference, for which we are attempting to secure equipment that will automatically make the stripe if practicable, with as little additional labor in handling as possible.

We may find it necessary to have equipment for putting on more than one stripe. However, our present orders cover a single stripe only. If you are familiar with the type of equipment we should have, will you kindly furnish us with a list of the manufacturers of such? We are desirous of securing this equipment as promptly as possible.

We understand that in your February issue you had an article written regarding this equipment. If you have a copy of same on file we should be pleased to have you forward it to us, and for which we thank you in advance.—M. W. Co. (Woodenware)

Finishing Process Engineer

Due to business conditions, I have resigned my positions of Vice President, Director and Chief Engineer of the Weber & Scher Mfg. Co. Inc., of Newark, N. J., and have entered the field of Professional Engineering.

During the 8 years of association with the company, and as part of my duties, I had charge of the development, design and construction of the dip-lacquering equipment built by the company, and handled the research

(Continued on page 6)

From the Editor's Desk

IT IS REPORTED that the use of chromium on automobiles has reached its peak and that the pendulum of popularity is due to swing from chromium to color. Color identical with the hood or body is particularly recommended for radiator shells, reasons being that: (1) it gives an illusion of greater length to the hood, (2) for some time colored radiator shells have been fashionable on exclusive European cars and some custom models of this country, (3) it is less expensive in both first cost and in refinishing, (4) it provides a welcome change from the use of "too much chromium" all over the car, and particularly at the front end.

THE GLASS bottles for many liquid products—particularly those in the cosmetic and beauty preparation line—are being redesigned and painted to snap up their appearance and give old products new sales appeal. This calls for more color finishing and it thrusts forward a finishing problem—but judging from the appearance of some of the newly shaped colored bottles we have seen recently, the problem of color finishing glass bottles has been solved effectively and economically by some concerns.

IF CHROMIUM and glass are giving way to color in some lines, doesn't this suggest something about what might be done in other lines?

WHAT ARE YOU doing in your finishing room or rather, "what are you doing to keep abreast or ahead of the times," asks the manager of a concern that does custom work. He goes on to state that his company has tooled up the finishing room and all other departments to handle even small jobs at a low cost to get in line with the low selling prices prevalent today. How he did it is too long to be told here and too late to be published elsewhere in this issue. It will appear as a feature article next month.

NEW DENATURED alcohol formulas, designated as No.5, No.5A and No.10, are announced by Commissioner Doran of the Treasury Department. The new denaturants are: "Calorite" used in No.5, "Pontol" for No.5A, and "Tecsol" for No.10. The research staffs of three large concerns are identified as having been helpful or chiefly responsible for the development of these denaturants, namely California Standard Oil Co., DuPont Ammonia Co., and Tennessee-Eastman Co. These formulas represent a commercial advance, being non-toxic but adequate to protect the Government's interest.

W. H. Rohr

Managing Editor

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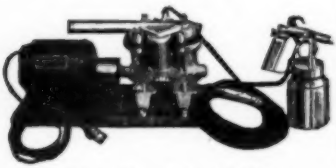
SPRA-MORE
"55"



Price, Complete, $70.00

The remarkable performance record of the Super Spra-more "55" is consistently winning sales over other makes of spray-painting equipment in its price class. This value may easily be proved in your own finishing department, doing your job, with your materials. May we give you the facts? It may enable you to substantially reduce finishing costs! Write

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1218 Venice Blvd. Los Angeles, Calif.
Boston, 105 Broad St., Newark, N. J.,
1057 Bergen St., Chicago, 551 W. Lake St.,
Houston, 1027 E. 11th St.

(Continued from page 4)

and experimental work in connection therewith. Production studies and large installations were made in the plants of a number of nationally known manufacturers, and included both air-drying and baking equipment. Relative to the earlier installations, I refer to my article which appeared in the Nov. 1928 issue of this magazine.

As part of my activities, I propose to carry on the development and design of this class of production equipment, and to act as a consultant on the problems related thereto. Further, it is my plan to supply the designs and engineering service to those clients who desire to handle their own construction, or to make the placements of the construction where it may be to the best interests of those concerned.

Since my graduation from Lehigh University, as a Mechanical Engineer, I have had over 30 years of broad experience in the engineering, manufacturing and production fields, and in the development of inventions and special equipment. I believe my background provides assistance of value to those interested in the improvement of production conditions.

Should you have inquiries concerning this or other engineering projects, I shall greatly appreciate your advice relative thereto, and also your support in my behalf.—AUGUSTE L. SALTZMAN, M. E., 586 Central Ave., East Orange, N. J.

Non-Tarnishing Lacquer for Bronze Tablets

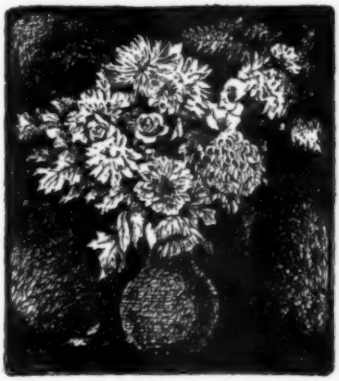
We are interested in a lacquer for use in coating memorial tablets. We have a lacquer that, so far as we know, is about the highest priced article that is made, but it does not prevent bronze from tarnishing when used on a tablet *not* exposed to the weather. We wonder if you have an advertiser who can furnish a lacquer that will retain the finish on cast bronze, as is the case in lighting fixtures made of rolled and stamped brass. If so, we would like to get in touch with them.—E. I. W.

Improved Wax Doesn't Damage Finish

Water emulsion waxes have recently come to the fore as polishes for rubber, linoleum, and leather floorings. Certain old fashioned waxes were found to be detrimental because of the solvents contained therein.

(Continued on page 44)

DECORATIVE



FINISHING

Decorative finishes play a very prominent part in making many products saleworthy. On other products, decorations would be ridiculous. The nature of your product determines, to a considerable degree at least, the type of finish most appropriate. This rule is more flexible today however than ever before. Many products, handicapped for years by drab, unattractive coverings are today stepping out in the fine raiment of beautiful finishes.

Let our studio help solve your problems. We create plain or decorative finishes best suited to the needs of your particular product. This service is rendered without cost to reputable firms. Write us today.

ROCKFORD VARNISH CO.

ROCKFORD, ILLINOIS

HELD UP?

● Have costs got "the drop" on you? In striving for improved finish and appearance which will increase the saleability of your product, are costs "holding you up"? In this age, when sales depend upon appearance, your product finishing operations may hold the answer to vanishing profits.

Finishers all over the country are consulting with DeVilbiss representatives every day. These DeVilbiss men are able to suggest ways and means to get a better finish at a lower cost because in addition to their own wide experience and thorough training, they are able to offer you the technical knowledge of the DeVilbiss engineering staff.

No matter what you finish, hairpins or pianos,—you can do it better, faster, and more economically with DeVilbiss Spray-finishing Equipment, either in standardized form or in a special installation designed for your particular and exclusive problem. The replacement of old, wasteful, obsolete equipment with new, highly efficient DeVilbiss Equipment may spell the difference between more sales at a profit or lower sales at a loss. But the only way to know whether your finishing costs are too high is to make a thorough, relentless examination of your Finishing Room. Take the DeVilbiss representative with you. You may be surprised to learn how little you need to invest to gain a definite cut in costs. Send for the DeVilbiss representative. Or Write.

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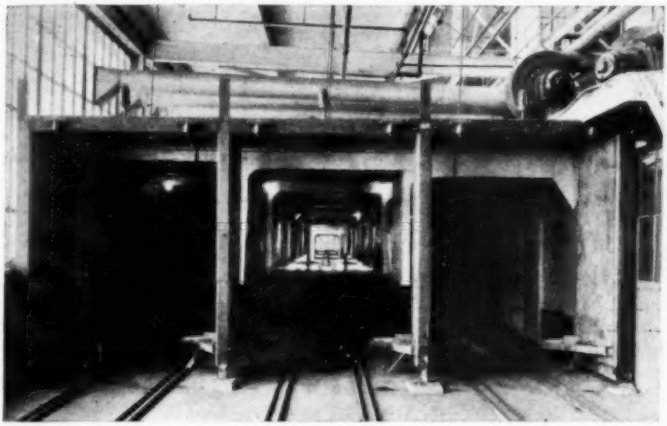


VENTILATION

for the safety of finishers and their employers

by C. DAN YOUNGS

A RECENT news headline in an Oakland, California newspaper may be of interest to the finishing fraternity, and cause some thought on the subject of ventilation.

"Oakland Employe Sues for $95,000."

A former employe of a manufacturing company filed suit for $95,000 against the concern for asserted personal injuries and loss of earning capacity. According to the complaint, as a spray paint worker for the company, he was employed in an improperly ventilated room. The fumes, he asserts, injured him to the extent of $75,000, and the $20,000 remainder was asked for loss of earning power.

Whether or not this particular claim is justified, and whether or not any spray paint operator could be injured to such an amount is, of course, a matter for the Courts to decide, but whichever way the judgment is rendered, there remains the incontrovertible fact that proper ventilation of spraying rooms is absolutely necessary.

The questions of toxic effects of fumes from paint materials has been much discussed, and it seems that actual practice has shown this to be a badly over-rated danger, providing some care is

given to securing some air currents in the spray room.

It is not so many years ago that, with the advent of nitrocellulose products in finishing, great fear was expressed at the reaction of the human body to contact with fumes from these finishing materials.

Poisoning from bodily contact was soon proved to be a myth, and where it did exist, it was not traceable to the lacquers but to the benzol content of the thinners then in use. This has now been eliminated by laws, rulings of insurance companies, and the desires of finishing material manufacturers to safeguard the health of the working class as a whole wherever possible.

The question of toxicity from fumes, however, was shown to have some foundation, and since from the very nature of nitrocellulose products it was found impossible to totally eliminate them, the solution was found to be in the operating procedure, which has resulted in the prevalent use of exhaust systems. These are now used in practically every finishing room.

But the point which is often overlooked is whether or not the exhaust system in use is the most efficacious—whether it removes sufficient cubic volume of air to render spraying operations safe—and whether it is placed in the best position in relation to the spray booths. If the fan is in a far corner of the room, some distance removed from spraying operations, it is almost as useless as none at all, since lacquer fumes will not immediately rise to a sufficient height to clear the intervening space.

It is of course a fact that some industries, which spray large pieces, cannot enclose such things during the spraying operation, and must of necessity spray them in an open space. This presents a different phase of proper ventilation than the smaller pieces which can be placed in a ventilated booth—wherein the exhaust fan and vent can be placed in the rear of the booth, at the proper distance above the material being sprayed.

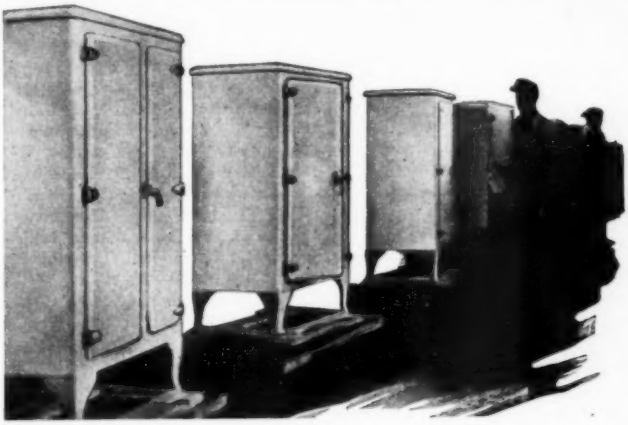
With these larger pieces, however, exhaust fans should be spaced at regular intervals, so that the air currents will move as closely as possible to the outlet of the spray guns, and measurements can be taken to make sure that the proper ratio of air displacement to cubic volume contained by the room, is kept at all times.

Attention to this feature will obviate any possible expenses incident to either factual or asserted personal damages received by workmen. In either case, there is a loss of time, lawyers' fees, and in some cases, possibly the feeling that through the firm's neglect a workman has been actually injured.

This subject should be given serious thought and study by every firm employing spray equipment in finishing departments.

Structural Gypsum Corp. Acquires Zenitherm Co.

The Structural Gypsum Corporation, a subsidiary of the American Cyanamid Co., has concluded negotiations whereby it will take over on July 1st the assets and business of the Zenitherm Co., Inc., manufacturers of Zenitherm ornamental floor and wall tile. These products will complement the Structural Gypsum Corporation's line of Gypsteel gypsum products, especially its structural fireproof floors, partitions, etc. The present plant of the Zenitherm Co., at Newark, N. J. will be moved to the Structural Gypsum Corporation's Linden, N. J., plant.



Finishing KELVINATOR Refrigerator Cabinets

by CHARLES C. THOMAS

Cabinet Engineer of Kelvinator Corporation

THE KELVINATOR Corporation is one of the largest manufacturers of refrigerator cabinets in the world. It produces cabinets not only for its large production of Kelvinator domestic electric refrigerators for world-wide distribution, but for Leonard Electric Refrigerators, during the past two years, which have been widely marketed to outlets other than those handling the Kelvinator line.

All of these cabinets are built at the plant of the Leonard Refrigerator Co., which for several years has been owned by and operated as a division of the Kelvinator Corporation. In addition to the Kelvinator and Leonard cabinets, the Grand Rapids plant manufactures under contract the cabinets used by several of the leading manufacturers of electric refrigerators.

The 50 year old Leonard Refrigerator Co. originated porcelain ice refrigerators and operates what is generally conceded to be the most modern and largest porcelain plant in the country.

As certain models of both the Kelvinator and Leonard lines have lacquered exteriors, much thought

and experiment have been directed to develop the ultimate in finishing methods and materials for such cabinets. Perhaps readers of INDUSTRIAL FINISHING may be interested in a brief statement of the operations of Kelvinator in finishing the exteriors of its lacquered cabinets.

In our opinion, in order to produce a paint or lacquer refrigerator finish of lasting beauty and one that is free from field complaints, four very definite steps are necessary.

First, exhaustive laboratory research of materials to be used must be made.

Second, thorough production research of materials and methods must be worked out.

Third, the processing or preparation of the surfaces to be finished must be established.

Fourth, a very definite plant specification set up for controlling materials, processing and uniformity of products, should be made operative.

Most finishing materials are "built" with a certain amount of flexibility to compensate for the variation due to the human element in the plant. However, there is always one set of given conditions under which a finish will work out best for uniform quality results and, after this set of conditions has been determined, the shop should be set up so as to religiously follow these conditions without deviation.

If paint operations are not handled in uniform manner from day to day, uniform results cannot be expected even with the best of finishes. Consequently, we feel that the greatest stress should be laid on shop operations.

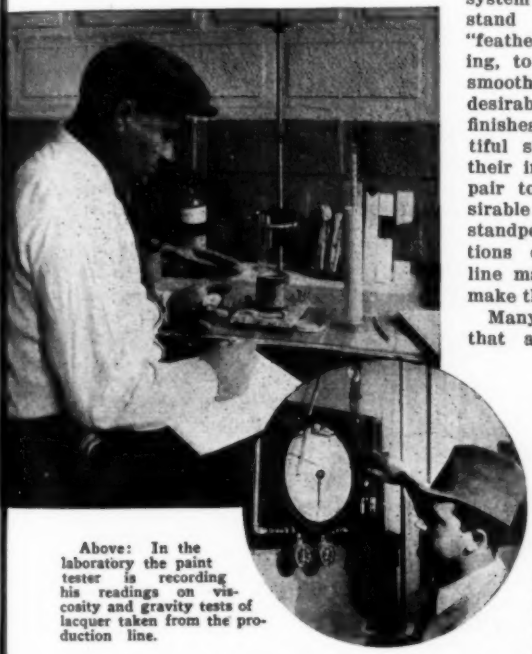
Number one requisite, that of laboratory research, is rather expensive but it pays dividends. In the case of a finish such as goes on a refrigerator, it is necessary to determine in a few short months what will have happened over the life time of a refrigerator. Accelerated tests of an exhaustive nature are made to determine the toughness of the material, its resistance to chipping, its adhesion, its resistance to fading or yellowing, its resistance to reaction of greases, its reaction to high humidities and, last but not least, the life of the material.

The accuracy of laboratory determination of the quality of any finish can, of course, only be proved out by field reaction over one and a half to two years. Consequently, the establishment of a laboratory procedure requires considerable experience in this line over a considerable period of time.

We mentioned above the second requisite—that of production research. After the laboratory has determined that a certain piece of goods or a certain finishing system has the required quality suited to the particular job, it is necessary to find out if the materials as prepared can be applied in the production line up as it stands, or if certain changes in production equipment must be made to get the desired results. The economy of a given system or rather the cost per square foot of finishing a given surface cannot be accurately determined in the laboratory, consequently it falls on the production research to determine the cost within some degree of correctness.

On the production line there is not always sufficient time nor space to permit a finish to pause or age in case the material happens to be built with this requirement. It is sometimes necessary to make a change in a piece of

goods to permit it to operate in a given production setup. Materials, desirable from a production standpoint, however, are so prepared that the first coat, or prime coat, is ready to be sanded after its first bake and directly upon being received from the cooling tunnel to bring it back to room temperature. A good material must not caseharden and must be thoroughly baked out so that upon sanding, it will smooth out into a uniform, glass-like surface.



Above: In the laboratory the paint tester is recording his readings on viscosity and gravity tests of lacquer taken from the production line.

Final coats of lacquer must go onto the primer without too great softening of the primer coat and without any trace of lifting. After the final lacquer coat has been applied and the work has come through the force dry oven, the finish must be sufficiently hard to allow the cabinet to be trimmed and the doors assembled without gasket printing.

Another very important thing which must be checked up in the production research is the ability of a finished surface to take a touch-up. Any imperfections due to imperfect spraying or damage of the film by tools on the assembly line must be touched up in a separate operation. Any system which will not stand out readily or "feather out" upon sanding, to leave a perfectly smooth surface, is not a desirable material. Many finishes show a very beautiful surface but due to their inability to take repair touch up, are undesirable from a production standpoint because rejections on the production line may be too heavy to make their use economical.

Many times it is found that a material, having passed satisfactorily the laboratory test, is brought to the production research only to find that the material must be changed in order to fit the production setup. If the change is a major change then it must go back to the laboratory for another check up to see whether or

Left: Setting the recording thermometer. This recorder on the baking ovens indicates the heat units in the middle of the ovens where a uniform temperature is maintained during production.

not such change has impaired the quality of the material. It often takes months of effort between the laboratory and the production research to secure a material that will be satisfactory to both.

The third requisite—namely, preparation of the surfaces to be finished—is a subject on which all manufacturers do not agree. The one point on which all are in agreement is that the surface to be finished must be clean and free from foreign matter. The method of bringing this about is, of course, debatable. The steel always comes to the finisher with a film of grease on it and a certain amount of rust is ever present, although it may not be seen by the naked eye. Furthermore, stampings from the presses may have drawing compound slightly embedded in the surface of the metal, all of which must be removed.

EDITOR'S NOTE: Next month Mr. Thomas will tell how Kelvinator cleans the metal before finishing and controls the uniformity of the finish on its electrical refrigerator cabinets.

Finish Sells Product

A well known Chicago firm asked me this question: "Why is it that one concern can manufacture cheap case goods, well designed and finished, and sell practically as fast as they can manufacture, while another firm manufactures a good grade of furniture, puts on a fair finish and still can't sell the goods even at reduced prices?"

Not getting too personal but, Mr. Manufacturer, why did you choose your wife in place of one of the hundreds or thousands of other young ladies equally as good looking, or possibly better looking, which you saw before marriage? This question is very easily answered with one word—appeal. She appealed to you; she fascinated you. That certain word "appeal" applies also to furniture.

Make your furniture so that it appeals and fascinates. If you must cut in manufacturing costs, don't cut in the finishing or designing, as 70% of the housewives, whom you have to depend upon for sales, know nothing of construction. Of course, substantial construction is important too, and so are quality woods. But if your products are pleasing to the eye and have a smooth finish it helps sell your goods. You have probably noticed people of both sexes window shopping. What stores do they enter? Almost always the store where they see something that appeals to them, and if they possibly can afford it, they will buy what satisfies their fancy. Remember to make your finish as smooth and appealing as possible.

Do not forsake your rubbing operation and let your furniture go out on a flat lacquer or flat varnish finish, and think you are getting away with something. In choosing her furniture, about the first thing the modern housewife does, after she finds what appeals to her, is to rub her hand over it and see how smooth it is. If it is smooth you will always hear her remark about it, and the sale is made. If it isn't smooth you have lost another sale.

Don't forget that a little color decoration or perhaps some sensible highlighting added on your furniture gives it that individual touch of character and artistic workmanship which helps to make sales, and removes it from the class of the production line. Try it and see.—R. F. Daniels.

Finishing Maple

Since maple is now being featured in some of the better lines of furniture, I am prompted to submit a process which seems to give a practical and economical finish on this wood.

by JAMES McFADDEN
finisher

MAPLE, being one of our higher priced cabinet woods, is attractive when finished natural. Our maple stock in process is not put through the filling department at all; it comes from the cabinetmaker's room thoroughly sanded and inspected, and is immediately given an application of orange base stain. (This is a thin, spirit sizing material and can be reduced to any desired shade. A little yellow added tends to assist in giving a very rich undertone for a maple finish.)

The orange base stain is either brushed or sprayed on; brushing is preferred, since a soft hair brush is more likely to produce uniform, splotch free, stained surfaces. The stain is allowed to dry for an hour or so; then a spray coat of lacquer sanding sealer is applied and permitted to dry. The surface is then sanded with either No. 4/0 or No. 6/0 sandpaper. Incidentally, this is the only sanding operation during the finishing process. Maple, being a hard surfaced and non-porous wood, and due to the character of the lacquer sanding sealer, responds readily to a glass-like surface.

With all suction of the wood now eliminated, a brown overtone or lacquer shading stain—preferably a light, reddish brown—is applied. A skilful spray operator can shade and highlight this work to a very pleasing degree, for the lacquer shading stain is thin and transparent. However, best results are obtained by limiting the air pressure to 10 or 15-lbs., thus blending off into a beautiful antique effect.

Two coats of semi-gloss lacquer are applied over the shading stain, allowing the proper drying time between coats. The surface is then ready to be rubbed.

For rubbing we use three parts of paraffin oil to one part gasoline. This aids the cutting action of the rubbing abrasive and prevents gumming up without producing either grayness or scratches. Then too, we have found that in using woolen cloth (instead of burlap) and mixing a little rottenstone with the pumice stone, much

of the so-called "oiling off" is eliminated.

For the final cleaning up we use a cleaner made up of equal parts paraffin oil, pure turpentine, and pure cider vinegar. This simple mixture seems to clear away the gummy, sticky effect which sometimes appears after rubbing lacquered surfaces, as well as brightening up the surface and leaving it almost entirely free from grease. However, a "shake well before using" of the bottle or container is required to put the cleaner in solution with the oil.

With the exercising of reasonable care and cleanliness not a great deal of rubbing is required, and upon the final cleaning up, the surface has a soft velvety appearance and touch equal indeed to the oil-wiping or acid and water stains, which are more or less slow and expensive.

While speaking in terms of economizing our wood finishes, I think most finishers will agree that in many instances this is a condition that has been exercised almost to the turning back point, and the impulse is to give a little better finish by way of absorbing a possible reduction in prices which might be made to fit into the channels of our present economic depression.

Pearl Essence

Pearl essence is used to imitate pearly luster. Applied as a coating material it gives ordinary beads the appearance of pearls. Technically, it is a suspension of the natural crystals of guanin in a suitable liquid such as ammoniated water, amyl-acetate, or acetone.

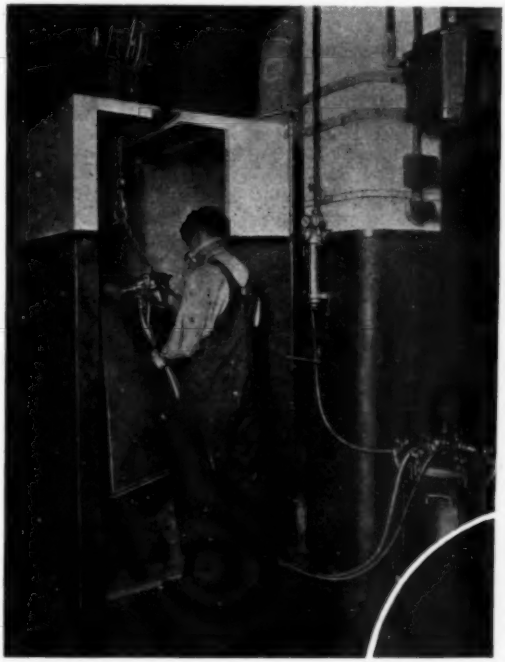
The discovery of pearl essence is due to Jacquin, at the end of the 17th Century. He noticed that the water in which a small fish had been washed contained a highly lustrous substance, producing by application on small globes of alabaster or glass a good imitation of pearls.

Until 1914, or at the beginning of the World War, pearl essence was made exclusively in Europe from the ablette or bleak fish of the minnow family, not found in the waters of this country. Now it is produced in New England from sardine herring, and alewife scales, in Virginia from shad, and in the New York metropolitan district from materials shipped from various points using glut herring, hickory shad, pilchard, ladyfish, whitefish, cisco, and menhaden.

The blade structure of the essence crystals is essential to produce the luster; one gram of the crystals has an aggregated surface of about 12,575 sq. cm.—somewhat more than a square yard—and contains about 312,500,000 individual crystals. Their specific gravity is about 1.6.

The crystals show their maximum luster when oriented parallel to each other. In view of this fact the manner of application of lacquers or other materials containing pearl essence is important in obtaining the maximum desirable optical effect. Methods of manufacture of the suspensions are for the most part trade secrets.

The examination of pearl essence is not done by a well defined or determined procedure. No standards of concentration, covering power, or value have been set. While the eye of an expert is indispensable to judge the product it takes into consideration properties which physical chemists measure but which experts would call: Fineness of grain, tint, luster, concentration, and body.—PROSPER E. CHOLET in—*The Chemical Digest.*



Controlled Results in Machine Finishes

by B. V. McBRIDE
Materials & Process Dept.
Westinghouse Elec. & Mfg. Co.

HIGH speed finishing methods are a very essential factor in the present-day production schedules. A finishing time of two hours from spray booth to shipping floor is not at all uncommon for some types of machines.

To keep pace with this high speed production, manufacturers have had to shorten the painting schedule considerably by decreasing the time allowed for the application and for the drying of the

finishing materials. This has been accomplished by the use of new types of fast drying materials, and by the introduction of improved methods of application. However, a rigid control of both materials and processes has been found necessary to insure complete and continued protection of the machines under normal service conditions.

The first attempt to shorten the drying time involved the use of high-temperature baking equipment, with its attendant problems of ventilation and fire hazard. When fast airdrying lacquer finishes were introduced, the baking equipment seemed unnecessary, but later it was used to obtain low temperatures for forced airdrying of these same lacquer finishes. At present this is the fastest finishing method available, but it is neither the most economical nor is the lacquer finish necessarily the most durable.

To effect economies durable synthetic resin base finishing materials are being introduced. Although somewhat slower drying than lacquers, these materials have certain desirable advantages over lacquers such as higher gloss without rubbing, thicker films for a single coat, better adhesion to metal, harder and more durable films, and better suitability for brush application. The drying time is ordinarily about four hours, which is not too slow for most applications, but which can be decreased to the airdrying time of lacquers by the use of low temperature forced drying ovens.

A reduction was made also in the time allowed for the application of the finishing materials. The high speed methods favored today are spray painting and flow painting. The spray method is now well known in all industries. The flow method is merely an adaptation of the dip method and consists of flowing the material over the surface by means of a hose and allowing the excess to drain off.

Finishes are applied to machines for both protection and decoration; for the first, the finish should be hard, durable, adhesive, weatherproof, and in many cases oilproof; for the second it should have good gloss and color retention because of the value of gloss and color as a sales incentive. The fast drying materials available for this work are numerous, but are quite variable in quality, and cover a wide price range.

Naturally, low cost materials are desirable from the standpoint of economy, but unfortunately, many of these are almost worthless as protective coatings, and do not retain their gloss and color well. These must be weeded out by performance tests designed in such a way that only satisfactory materials can pass.

Performance tests should be simple and should be designed to duplicate or accelerate the actual conditions to which the material will be subjected. The essential tests are those which determine the effect of age on the hardness, adhesion, gloss, and color, and the effect of weather exposure on the appearance and rust resistance of the material.

The determination of viscosity and percent of solids is an important adjunct to the performance tests because probable performance under exposure can be estimated closely. Test data indicate that the amount of protection obtained against weathering is dependent more on the thickness of the paint film than on the quality of the material. The thickness is regulated largely by the viscosity and the solids

content of the paint. High viscosity materials require large amounts of thinner for application, resulting in a decrease in the solids content.

Excellent results on weathering tests have been obtained from the material, and ranges from ½ hour for fast drying lacquers to 48 hours for paints. After the conditioning treatment the finish is in approximately the same condition as it would be after several months of normal exposure, and

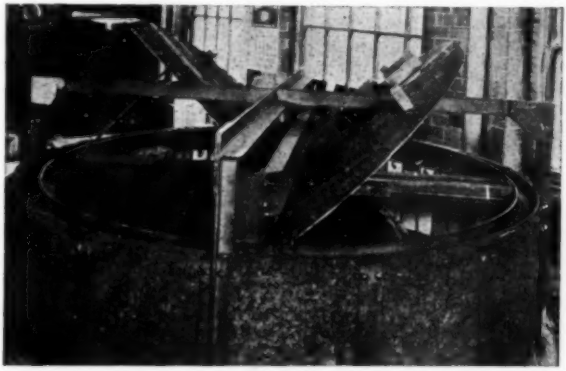


Fig. 1—A quick weathering test. Panels are supported on rotating walls and are carried through a water spray into an ultra-violet light chamber and back again through the water spray. Complete tests can be obtained this way in 30 days.

two coats of a lacquer having a low viscosity and high solids content, while on the same test two coats of a lacquer having a high viscosity and a low solids content failed in a comparatively short time due to the thinner film. When these same lacquers were compared on the basis of equal film thickness, the latter material was superior in weathering tests.

The following brief description of tests illustrates the methods in use to determine the quality of the materials used for finishes.

When the effect of age on a finish must be determined in a comparatively short time the coated panels are placed in a conditioning oven operated at 140° to 176° F. The time of conditioning depends on the air drying time of can be examined for hardness, adhesion, weathering properties, etc.

The resistance of finishes to weathering is best determined by exposure to actual weathering conditions. Panels are exposed to weather and sun by placing them on a test fence facing south at an angle of 45°. Monthly examination of the panels is made to determine changes in color and gloss, cracking or crazing of the finish, and the amount of rusting. Some test fences are constructed with flaps to protect one end of the panels from the effects of the weathering. This permits a direct comparison between original and exposed finishes on the same panel.

When quicker results are desired the weathering of the finish

is accelerated by placing previously aged panels in an accelerated weathering machine and exposing them to alternate cycles of water, heat, and ultra-violet light until failure results. In the machine illustrated in Fig. 1, the panels are supported on the rotating walls of the machine and are thus carried through the water spray into the light chamber, and back again through the water spray. Complete tests can often be obtained in about 30 days by this method.

Humidity cabinets are of value in the testing of finishes employed on apparatus used in locations where the air contains a considerable amount of moisture. Frequently such apparatus is covered with drops of water condensed from the air. For this test previously aged panels are subjected to a saturated atmosphere at a temperature of about 86° F. in such a way that a continuous condensation of water occurs on the finish. Inferior finishes are readily detected by the appearance of rust, or softening and blistering of the film. An arrangement of panels in a novel humidity cabinet appears in Fig. 2. The openings in the side contain panels with the finish facing the inside. The cabinet contains warm water circulated by thermo-syphon action through an electric water heater. The vapor condenses on

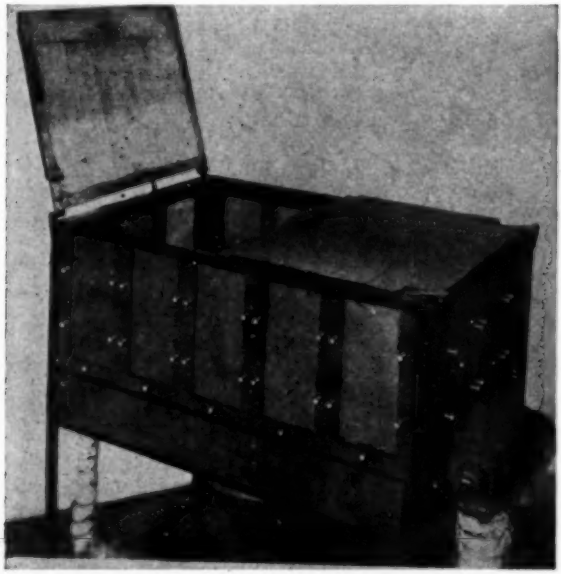


Fig. 2—Humidity test. Previously aged panels are subjected to a saturated atmosphere at a temperature of about 86° F. in such a way that a continuous condensation of water occurs on the finish.

the panels due to the temperature difference between the inside and outside of the box.

Finishes subjected to marine exposure are best tested by exposure of aged panels to a continuous mist spray of salt water. As in the case of the humidity test, failure of the finish is indicated by the formation of rust.

Ordinarily, the hardness of a finish is estimated by scratching with the thumbnail. An interesting alternative is the Wilkinson pencil method which gives a numerical rating to the hardness. The test consists of writing on the finish with a series of drawing pencils graduated in hardness, starting with 4B and repeating with consecutive grades up to 9H using a pressure as uniform as possible on each. When a grade of pencil is reached which starts to scratch the finish rather than slide over it as the softer pencils have done, the hardness rating of that pencil is used as the hardness rating of the finish. Fairly consistent results are obtained by this method.

The adhesion of a finish is usually estimated by scraping the finish off the panel with the thumbnail or with a knife blade. An improvement over this method is obtained by the use of the Graham-Linton hardness tester, which gives a numerical rating to the adhesion. This device consists of a knife blade pressed against the finish by means of a calibrated spring. The pressure in grams required to cause the knife to cut through the finish and to scrape it off the panel is considered as the numerical rating for the adhesion of the finish.

The selection of satisfactory materials is only one of the precautions necessary to produce durable and pleasing finishes on machines. The remaining factors of importance are the complete and thorough preparation of the surface to be finished, thorough mixing of the material, and carefulness in the application of the material to the cleaned surface. Unless these are observed carefully, the tests performed on the material will be of little value.

Before applying finishing materials, it is important to clean the surface free from rust, scale, oil, dirt, and moisture so as to obtain good adhesion.

Rusting underneath the finish is a fault which is as prevalent now as it was formerly. The cause is often considered to be the poor quality of the finishing material, whereas the real cause is applying the material over wet rust or over loose scale underneath which moisture condensed from the air is trapped. The formation of rust continues underneath the finish and eventually raises the finish in blisters. This is no unusual condition, because a cold metal surface frequently drips with condensed moisture when the humidity is high.

Sand-blasting is probably the best method for removing rust and scale from large apparatus, although where this is not available, careful scraping and wire brushing will generally give satisfactory results. Dirt and grease are best removed by thorough washing in hot alkaline cleaning solutions followed by rinsing in clean hot water.

As to the proper mixing and application of the finishing materials, much should be said with emphasis. The heavy pigments of the paint settle out of suspension, and unless mixed back again, will require excessive amounts of thinner before they can be applied. The resulting paint films will be

thin, porous, and will not offer proper protection.

The present practice of using the dip, spray, and flow methods tends to lead to the practice of adding excessive amounts of thinner so as to obtain good draining and freedom from sags and drips. This practice produces paint films of inferior quality because they are too thin for good protection, and often dull and lifeless in appearance.

To guard against this trouble as much as possible, the materials should be not only selected to have a high solids content and a fairly low viscosity so that excessive thinning is not necessary, but they also should be thinned no more than is necessary to obtain satisfactory results from the method employed. The thinning is best regulated by means of viscosity control using a cup type viscosimeter.—*Electrical Manufacturing.*

Pine Oil Valuable

Paint technologists have found that the addition of steam-distilled pine oil to paints improves quality and ease of application in practically all types of paint, it is stated by naval stores authorities of the Hercules Powder Co. Several manufacturers of synthetic resins are now advocating the use of pine oil in paint liquids containing these resins to improve brushing, flow, and leveling, according to the statement.

An important characteristic of pine oil is its toxicity against certain organisms and fungi. Antifouling marine paints contain pine oil to improve toxicity. Tests show that resin type paints, that contain straw colored pine oil in the liquid portion, are superior for marine protection.

The addition of steam-distilled pine oil to paints yields the following results:

1. Easier brushing and better spreading and adherence of the paint film.
2. Better flow and leveling.
3. Aids prevention of dry rot and leaf mold.
4. Deodorizes petroleum thinners, fish oils, etc.
5. Improves pigment dispersion, especially metallic pigments.—Hercules Powder Co.,

Customers' reactions to a product are often registered as good, bad or indifferent by one lone factor—the finish.

American Cyanamid Organization

American Cyanamid Co. announces that, effective July 1, 1932, American Cyanamid & Chemical Corporation, a wholly owned subsidiary, will consolidate the activities formerly carried on by the following subsidiaries:

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A. Klipstein & Co., Inc.
Kalbfleisch Bauxite Co., Inc.
Fumigators Supply Company
Superior Chemical Co., Inc.
John C. Wiarda & Co., Inc.

At the same time the activities of American Cyanamid Co. in Industrial and heavy chemicals will be merged with those of American Cyanamid & Chemical Corporation. American Cyanamid Co. will continue to handle fertilizer materials and mining chemicals as in the past.

In addition to the above, the activities of the following companies will at the same time be placed under the control of American Cyanamid & Chemical Corporation: American Powder Co., The Selden Co., Structural Gypsum Corporation, Owl Fumigating Corporation, and The Kalbfleisch Corporation of Surinam (Dutch Guiana).

The Officers of American Cyanamid & Chemical Corporation are:

W. B. Bell....Chairman of the Board
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ON highly polished articles such as copper and brass, Zapon Metal Lacquer # 946 produces a brilliant and extremely tough finish. It contains maximum solids, allows maximum reduction, produces an excellent finish either by dipping or spraying, and is one of the most useful metal lacquers available.

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Dyeing Splint Baskets

by L. B. MILLER

This article is an answer to a basket manufacturer's request for information about dyeing or staining splint baskets—colors to be fast to water and economical enough to permit of application to a very low-priced commodity.

WITH several methods of finishing splint baskets now available, the logical one to recommend for any particular case will be more or less dependent upon the time allowable for finishing, the floor space available, and the permissible cost of finishing per item.

Where time is not too pressing and where price is a predominating factor, one method is to dip the baskets in water solutions of water-soluble dyes. This type of dye is as fast to light as can be obtained with dyes, and it penetrates the wood surface. After being dipped in these water-dye solutions, the baskets will have to be given an overnight drying before they are finished with lacquer.

The lacquer in all of the types of finishes mentioned in this article should be of the clear exterior type. By this, I mean a lacquer that will withstand outside exposure and will not water spot.

After the baskets have been given this overnight drying, they may be finished off with one or two coats of the above-mentioned lacquer. The number of coats of lacquer necessary will depend upon the cost or quality of finish desired.

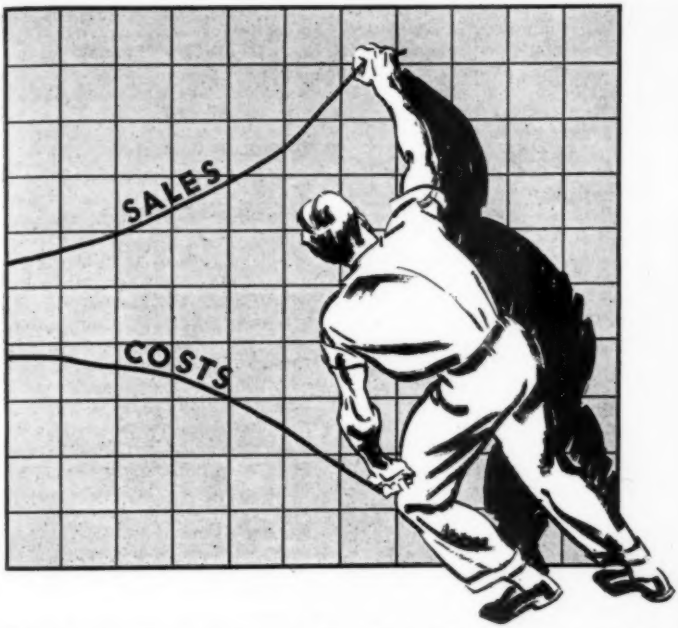
Should the available space for hanging the baskets to allow the overnight drying be too small, then the new type of non-grain-raising stains may be used. These solutions will run considerably higher in price, but they will hold down the wood fibers much better and the stained surfaces can be coated with lacquer 15 to 30 minutes after being dyed.

Dye Solutions

Another method, that has proved very satisfactory in meeting competition with this type of article, calls for the incorporation of dye solutions with the clear lacquer. The dyes can be purchased in dry or powdered form, and they come in two types called oil-soluble and spirit-soluble. Some colors are much better in the oil-soluble type, while others are stronger and better in the spirit type.

The oil-soluble type works more satisfactorily if dissolved in a mixture of one part ethyl acetate and three parts of benzol. If it is undesirable to use benzol, then toluol can replace it in the above mixture.

When dissolving the spirit dyes, wood alcohol or denatured alco-



Is your FINISH doing its share?

This thin film of *finish*—is it *working* for you? Is its color right? Does it *look* like quality? Or will it scratch, mar, and wear quickly? Can it peel off? Is it costing you too much?

Are you *sure* of these things?

Until you watch actual people really buying your goods, you can't appreciate the vital importance of FINISH. It can make or break the sale.

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Call up the Egyptian man and let him size up how *your* finish can work harder for you.

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hol should replace the benzol or toluol just mentioned. These dye solutions should be made as strong as possible, so that the least amount of them may be added to the clear lacquer to get the desired color without cutting down on the solid content of the lacquer through their addition to it. Approximately ½-lb. of dry dye per gallon of liquid or solvent should suffice.

When dye solutions are made up to their full concentration or saturation point, it is well to allow them to stand for a day or so and then draw off the clear solution from the top, avoiding any agitation. This standing allows any inerts which the dyes invariably seem to have, and also any undissolved particles, to settle out.

Dyed Lacquer

After these dye solutions have settled, they are ready for their incorporation with the lacquer. The oil-soluble type of dye will work satisfactorily, but a little difficulty may be encountered when a spirit type dye is added to the clear exterior lacquer. Should this occur then the proposition should be taken up with the lacquer manufacturer. This is also another reason why the dye solutions should be made up as strongly as is possible. However, I am of the opinion that no difficulty whatsoever will be encountered. It might be well to add here that the exterior lacquer should be made up so as to remain flexible.

It has been found that one coat of the dye solution plus the exterior lacquer has given very satisfactory results as to color, holding down the fiber, and making the entire basket and color waterproof. These lacquers can be formulated to dry quickly or slowly. The slower they dry, the less bridging or bubbling across the splints—but it will also leave a thinner coat of lacquer on the work, due partly to soaking in and also to running off.

Drying of the Finish

Should the lacquer dry too quickly, it may result in a "scumming over" or drying on the outer surface first, not allowing any air bubbles to break through. These air bubbles will then remain encased in the lacquer coating.

Should a great deal of bubbling occur when the baskets are dipped, then a thin coat of lacquer sealer should be first applied. Another way to eliminate bubbling is to first heat the baskets before dipping, or else allow them to remain in a very thin lacquer until bubbling ceases. If it becomes necessary to apply the sealer or thin lacquer coating, then the dye solution may be added to this and the job finished off with clear lacquer.

Stiffening properties can also be obtained with certain types of these clear exterior lacquers, if this is desired. It might be of interest to some readers to add here that lacquers of this type have worked very well on ladies' straw hats, especially black and the darker shades of colors, stiffening them satisfactorily and eliminating entirely any possibility of them spotting from water or rain.

Ventilating Fan Bulletin

The L. J. Wing Mfg. Co., 154 W. 14th St., New York City has just released its new Bulletin F-5 which describes in detail the Wing-Scruplex safety ventilating fans. According to the manufacturer, the Wing-Scruplex safety ventilating fan is the latest development in their 40 years' experience in the design and manufacture of ventilating equipment.

Bulletin F-5 is illustrated and contains 8 pages, 8½ x 11-in. in size.

Refinishing Motor Cars

by RALPH RAND

In charge of refinishing for Land-Thompson Chevrolet Co., at Wyandotte, Kansas City, Mo.

MUCH of my work consists of repairing damaged fenders. Here the main object is to get a smooth job with a finish that blends invisibly into the surrounding surface. Since the original fender finish is baked enamel, and I repair with lacquer, this is something of a task.

The body man bumps out the dents, knocks off the finish from the damaged spot and grinds it down to an approximate smoothness, leaving, however, some scratches to be covered.

The bare surface being several layers of finish deeper than the surrounding surface, the first step is that of "slanting" or "feathering off"; this work is done by hand, using a coarse abrasive paper followed by the use of fine sandpaper wet with naphtha to prevent gumming.

The sanding extends to an inch or more outside of the original blemish, depending on the thickness of the old finish; fine sanding extends still farther.

Keeping the surface perfectly clean is important; care must be taken to avoid touching the surface with the hands before the primer or bond coat is applied, as invisible fingerprints can make trouble. On fenders, the primer is usually followed by about two coats of surfacer and two of finish, to build it up to the original thickness; on body spots more than this is necessary.

Sometimes we have to let a job go out without sufficient building up because of lack of time to allow drying; a customer may have only a limited time that he can leave the car for this work, but ordinarily we match the finish just as exactly as possible.

Matching the color is not difficult when working on a Chevrolet because we keep a stock of the original colors used on Chevrolets, but when other cars are brought in and we have to mix the basic colors, such as raw umber, chrome yellow, etc., to match the damaged cars, it is not easy to get the exact shades. And then the newly lacquered spot may hold its color too well! It may be almost a perfect match when I finish the job but the lacquer will keep its color longer than the baked enamel, as on the fender, so after a while the patched place will be brighter (show more luster) than the rest of the fender.

Luckily that is something the

customer cannot blame the refinisher for; he is more likely to complain about the original finish of the car.

Chipping; Blushing; Buffing

As to defects in spotting I find that chipping never occurs where proper care is used to have the metal perfectly clean when the primer coat is applied; no moisture; no grease; no dust; no finger marks; no acid left on. Any of these things can cause trouble.

"Blushing," that cloudy effect we find in black or very dark colors, is undoubtedly the result of damp weather preventing proper drying between coats. Extra care is needed to see that each coat is really dry before applying the next; also, the use of a slow thinner helps too.

Chipping, too, often results from too much of a hurry in applying coats. If a customer insists on having his car back so soon, better leave off a coat or two than to apply them too close together. Poor quality primer may be another cause of chipping.

Care must be taken that the final buffing is not over done. If it is, the final finish may be so thinned that spots will show up after a few weeks use and repeated polishing. Scanty final coating may result in the same thing.

We use the power buffer for rubbing and polishing the color coats on spots, finding it gives better results as well as saving time and labor—but on the "feathering off" and wet sanding of the surface coats, where the "feel" is necessary, the work is done by hand.

I use masking cream on the glass doors and 6-in. gummed tape for the body protection. In the following of curves around fenders, the paper is cut into 5-in. strips and the lower edges are lapped to form the curves. Where narrow beading or moulding is in the way I cover it with 1-in. tape which is flexible enough to shape to almost any surface. Any surplus or corners can be trimmed out with a razor blade.

All metal parts are brushed well with cup grease which furnishes perfect protection and is easily removed; in fact, it disappears in the buffing operation without further attention—and does the work better than anything I have ever found.

The very narrow mouldings, I do by hand with brushing lacquer, and any striping necessary I do free hand with a brush.

Colors Popular for Automobiles

According to the June issue of *Automobile Color Index*, published monthly by the Duco Color Advisory Service, Black's leadership in the field of automobile colors is being seriously challenged by the alacrity of Blue's current rebound.

Blue is very much more in demand at this time than it was last summer. All the blues to show popularity this month are of the purple blue variety with the single exception of Washington medium.

Green yellows, low in value and of moderate chroma strength are the best selling colors among the greens at the present time.

Brown is advancing in importance at a moderate pace. Brown's making their initial appearance in the list of leaders this month include Coffee Tan, a high value and strong chroma of Yellow Red Yellow; Worth Brown Light, a higher value of Yellow Red than Worth Brown; and two median value, weak chroma yellows, Desert Sand and Biscay Sand.

Grey and Maroon are both moving downward simultaneously.

The most appealing color arrangements are generally the simplest in composition and involve the use of few hues. A color and its complement in adequate value and chroma balance, affording an effect of restful proportion and blend, is the ideal color arrangement for motor cars or any other commodity.

NEW
"ECONOMY LINE"
of lacquers and sealers
by
BERRY BROTHERS

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This splendid and timely new 800 series of lacquers and sealers has been developed by Berry Brothers for manufacturers who *must reduce* costs—but who don't want to throw quality overboard.

While the prices are low, the quality is comparable to lines much higher in price. Here, in brief, are the specifications:

814B LACQUER SEALER—*An extremely fine product, dries to sand in 30 minutes. Sands very easily. Builds on the surface. Holds out succeeding coats.*

824 & 824A DULL LACQUERS—*Can be applied directly to the wood, sand well, and can be used either with a sealer, as a one coat finish, or by applying two coats of Dull*—eliminating the need for two separate materials. (*824A has a higher solids content.*)

839 CLEAR GLOSS LACQUER—*A great bargain. Has a high solids content, sprays with a minimum of orange peel, stands out with good fullness—rubs and polishes extremely well.*

QUALITY AT LOW COST—These products meet a vital need—solve the most perplexing problems of the hour—by permitting you to maintain quality while materially reducing costs. Write today for details and prices.

BERRY BROTHERS

PAINTS - VARNISHES - ENAMELS - LACQUERS

DETROIT, MICHIGAN WALKERVILLE, ONTARIO

Questions and Answers

Metal Paint; Electrical Contact

A weaving mill gives their bobbins a coat of what they call "Metal Paint." This coat is on the outside of the bobbin. A metal clamp holds the end of the bobbin. A metal finger rides on top of the yarn, but as soon as the yarn is all used, the metal finger comes in touch with the coating of metallic paint, and by so doing, makes an electrical circuit which automatically stops the machine.

We are trying to find out what kind of metal paint this is. We have made a mixture of lacquer vehicle with aluminum bronze, but so far have not been able to get a film strong enough to carry the electrical current. The product previously used was sprayed on one coat.

Possibly you can give us the names of manufacturers of this product; we could then import it already made, or let us have information regarding what kind of vehicle and what kind of pigment is to be used.—J. R. C.

Evidently you are interested in a conducting paint. While aluminum paint might work satisfactorily for an application of this character, the potential involved would have to be rather high. In other words, aluminum paint is not in the class of a conductor, but more in the class of a very poor insulator. It will break down and conduct a current whose voltage exceeds 110, but it does not conduct currents whose voltage potential is much lower than this figure.

Better results would be obtained with an aluminum paint that showed "leafing characteristics," such as is produced by mixing the aluminum bronze powder freshly and applying immediately to the surface to be coated. A lacquer vehicle should not be used because lacquers in general do not have this leafing characteristic. We would suggest that a synthetic type of varnish* be used, since this type of liquid not only shows high leafing, but also is very resistant to the corrosive conditions under which bobbins are sometimes used. We would suggest a mixture of 2-lbs. of——* aluminum bronze to a gallon of the synthetic varnish.—ALUMINUM CO. OF AMERICA.

For the bobbin's coat of mail we suggest the following mixture be tried:

Black Dipping Lacquer*.....5-parts
Thinner* 1-part
Copper Bronze....16-oz. to the gallon

Spray on two or three coats of

*Name on request.

Speed . . that's what you want in a REMOVER

When you want the shop to "step on it," see that your men use a remover that works *fast*.

Lingerwett won its place as the largest selling remover throughout the country because of its *speed* as well as its efficiency.

One coat of Lingerwett will often do a job which would require two or three coats of less efficient removers. The reason is that Lingerwett is made of superior quality ingredients. These ingredients are *scientifically balanced* to produce the best results on any kind of finish—lacquer, paint, varnish, shellac or enamel.

Lingerwett does not change the surface to a sticky, slimy mass that is hard to clean up. Instead, it forms a soft, mushy sludge which comes off easily, leaving the wood surface in first-class shape for refinishing. Contains no acid or alkali—therefore it will not burn or discolor wood, nor injure the hands.

Give Lingerwett a Speed Test—send coupon for a free trial can.

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Mail this coupon for a FREE CAN . .

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115 Chestnut St., Newark, N. J.

Please send me a free trial can of Lingerwett Remover.

Name.....

Street.....

I. F.-7-32

City.....

this mixture; it will dry immediately.—A. B. LABORATORIES.

I suggest trying the same solution that is used in plating non-metallic articles, which is as follows:

Copper Bronze.....3 tablespoonfuls
Lacquer Thinner.....¾-pint
Lacquer (free of gum).....¼-pint

Mix bronze powder with thinner and then add the lacquer last.

The trouble you had with your mixture of lacquer and aluminum bronze was that you used too much lacquer, and this will not let the bronze come through. Try using the above formula with aluminum instead of copper. Use only enough lacquer to bind the bronze. —A. L. MEDEL.

Alcohol Watered?

What is a test for water in alcohol? How can it be taken out? I find it causes grayness in refinishing furniture.—D. N.

To test alcohol to find out whether or not it contains water, I suggest you take a small quantity of it and heat it gently over a slow fire. The alcohol will quickly evaporate, leaving the water. This matter of watered alcohol has come up before. In one case where complaints were made about water being in the alcohol and where it seemed certain such was the case, a chemist who was called in suggested that instead of containing water, the alcohol might be of such high proof that it condensed moisture from the air by its rapid evaporation.

This was a new idea indeed, and to test the theory a batch of material was cut with alcohol of a lower proof. A case was sprayed and no water appeared. That prompted the making of several experiments until it seemed evident that the chemist was correct in his diagnosis. The water came from the air in the finishing room rather than from the air-line or from the alcohol. After the air in the finishing room and the uncoated cases had been heated to the same temperature and dehumidified to some extent, there was no more sweating of the freshly sprayed cases.—W. H. R.

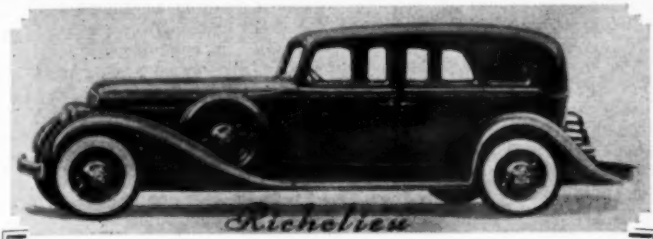
Finishing Cash Drawers

I have read with a great deal of interest, on page 50 of May issue of INDUSTRIAL FINISHING, the F. C. R. Co.'s question and F. W. Purdon's answer on cash register drawers. I finished cash drawers for a company for about five years. We dipped the drawers in oil cut with benzol and allowed them to dry for at least 24 hours. Then they were given two coats of lacquer, and then I added the third coat of lacquer, completing the finish.

If this is the kind of finish they want I will be glad to answer any further questions they ask. Will also be able to give them the name of the lacquer manufacturer and the plant where I finished the cash register drawers.—BERNARD E. HALL.

Metal Casket Trouble

For the past two or three months we have been confronted with a discouraging expense. Three out of every five metal caskets shipped out of our plant are returned by our customers for refinishing due to a rust condition forming under the lacquer finish. In other words, on the mitered corners of the bare metal, the lacquer finish appears to blister and peel off the welded and sol-



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E. I. du Pont de Nemours & Co., Detroit, Mich.
Egyptian Lacquer Mfg. Co., New York City
W. P. Fuller Co., San Francisco, Calif.
Hilo Varnish Co., Brooklyn, N. Y.
Jones-Dabney Co., Detroit, Mich.
Mountain Varnish & Color Works, Toledo, O.
Murphy Varnish Co., Newark, N. J.
R. N. Nason Co., Los Angeles, Calif.
Sewall Paint & Varnish Co., Kansas City, Mo.
Sherwin-Williams Co., Montreal, Canada
Rinshed-Mason Co., Detroit, Mich.
Standard Varnish Works, New York City
Valentine & Co., New York City

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220 25th St., Brooklyn, N. Y.

San Francisco Detroit Paris

dered miters on metal caskets—which apparently results from rust on the bare iron.

We use "Armco" lead-coated metal sheets in making up our caskets, and after the miters are welded and soldered we find that most of this lead coating is taken off by the heat and also by sanding and cleaning in preparation for finishing.

We are very much alarmed at this condition and therefore, we are asking your advice and very prompt comment on what could be causing this condition—whether it could be the metal or the lacquer and what we could do to overcome this condition.

We would also like to know the names of chemists or engineers who specialize in the solving of these problems, and any information you may have in regard to same.—H. C. I.

I suggest that after smoothing and cleaning the welded and soldered miter corners you immediately follow with a coat of rust inhibitive primer (I have seen it advertised in INDUSTRIAL FINISHING) which will serve the double purpose of preventing the formation of rust and affording an excellent base coat for following finishing coats later.—M. J. R.

Finishing Sap Gum

We are making a table entirely of sap gum wood and have been using an oil stain which strikes extremely dark on the soft places. I should like to know how to get a uniform finish on this gum wood. These tables are to be finished with varnish.—A. E. F.

I suggest you bleach the dark streaks with oxalic acid, either before or after staining. A strong solution of oxalic bleach is made by dissolving ¼-lb. of oxalic acid in one gallon of hot water. (Hot water makes the bleach more effective.) If the first coat does not bleach, put on a second application. Wash off with water and vinegar to neutralize any alkaline left, and to make the surface safe for finishing coats to be applied.

Gum wood should be toned before staining. A good toner for gum wood is a weak solution of chloride of iron dissolved in water and brushed over the entire surface and let dry.

Follow the toner with a thin brush coat of linseed oil and turpentine mixed in the proportions of one pint of raw linseed oil to one quart of turpentine. Let dry about ten hours and apply either water or oil stain. The application of linseed oil and turpentine aids in making a more uniform color and keeps the stain from "taking" in the soft spots.—T. R. NALL.

For finishing sap gum wood tables we recommend first sealing the soft spots with an oil sealer, especially if the job is a particular one; if not, then tone in the sap streaks with a permanent penetrating stain and follow immediately with an application of stain over the entire surface—sprayed, brushed or dipped. Let dry one to four hours, or fill dry, depending upon the method employed in staining. Next apply a spray coat of lacquer sanding sealer; let dry two hours and sand. Follow with finishing coats.—A. B. LABORATORIES.

In staining white or sap gum wood I have found pigment oil stain, sometimes called uniforming stain, to be both satisfactory

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Does not bleed or fade. DRIES INSTANTLY. Made entirely from water colors assuring fastness to light and non-bleeding. A perfect blending and shading medium. May be used either directly over filler or between sealer and lacquer coats.

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and inexpensive. This stain can be applied by dipping or spraying—spraying being preferred. Allow stain to set from 5 to 10 minutes and then wipe or blend with a soft rag.

If light spots or streaks show too prominent after the wiping operation, a lacquer shading stain may be applied just before the shellacing. In fact, these two operations can be done at one handling.—G. A. ANDERSON.

Sap gum, as a rule, is difficult to stain, or shade in such a manner as to produce a clear even tone, owing to the fact that when finished it will show streaks and small sharp flecks—that is, when the stain used is made up in the usual manner. The deeper the stain penetrates, the more the streaks and flecks are apt to show. To prevent this trouble and at the same time obtain satisfactory results in staining sap gum, I use linseed oil as a base for the stain and add a small amount of coloring matter.

A little paste filler added to the stain is sometimes helpful, and in extreme cases a thin application of linseed oil before staining usually proves effective.—E. C. H. ROTTMANN.

Plating Composition Carvings

We are interested in plating wood or composition carvings. Kindly inform us the method used in doing this work. We understand there is a new paste material that can be applied to wood that enables silver, silver-copper or gold plating to adhere to same without peeling or scaling.—H.C.I.

In preparing non-metallic articles for metalizing, the condition of the article must be considered first—that is, those surfaces that are very porous and those that are less porous.

There are various ways of preparing surfaces for electroplating. Wood may be prepared with the following solution, heated to 200° F.:

Beeswax	(parts) 1
Paraffin	3
Resin	½

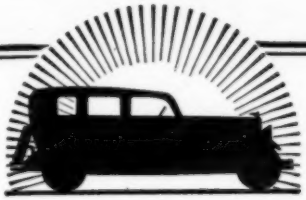
Leave the wood to be plated in this solution about 20 or 25 minutes so that the solution will penetrate the article; then remove it and allow to cool. When thoroughly cool, apply a thin coat of shellac. When this shellac coat is thoroughly dry, spray on two coats of the following mixture:

Copper Bronze	3 tablespoonsful
Thinner	¾-pt.
Cellulose Lacquer (free of gum)	¼-pt.

Add the bronze powder to the thinner; stir thoroughly and add the lacquer last. Spray on one coat of bronze powder and allow it to stand about 1½ hours before applying the second coat. After the second coat is applied, let stand about 3 hours before plating.

In making contact use a thin copper wire on the article—say 28 B&S gauge—leaving a loop on each end. Fasten a piece of 22 B&S copper wire on the upper end, and on the lower loop tie a piece of string to which fasten a weight to keep the article under the solution so it won't float.

Recently I plated a large piece of wood and had to use 12-lbs. of iron to keep it under the solution. It was plated 22 hours and came out a perfect job. On this article, being of very large size, I used 2-in. brass wood screws to make my contact. I used four on top and four on the lower side for the weights. After the article was plated and dried, I cut off the



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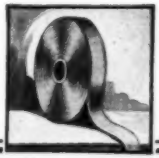

for the perfect job. No more blemishes from fuzz or selvage strings—no more apologies for ragged craftsmanship.

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Four years of careful and intensive research have gone into our perfected system of lacquer finishes for Presdwood and Celotex.

These extraordinarily adaptable surfaces are becoming more and more widely used in industry. Their finishing presents certain definite problems - we have the answer.

Makers of tile, cabinets, boats, toys, refrigerators and any other industrial production utilizing these boards, will find it profitable to consult us.

Write for our new descriptive bulletin

THE VARNISH PRODUCTS CO.

CLEVELAND, OHIO

screws leaving the points in the wood, and I filed down the projections flush with the copper. Only copper plating was required on this piece.

When the article is ready for plating, it should be first plated in a silver solution that is high in metal and low in cyanide. If the article has been properly coated with the bronze mixture, a uniform coat of silver will be obtained. The two principal merits of the silvering operation are that it shows whether or not the bronze is properly applied, and it makes the article more conductive for the copper solution.

Next, place the article in an acid copper solution for one hour or so, where a current density of 25 to 30 amperes per square foot is carried. When using high amperage in metal plating, it is best to agitate the solution with air to insure a uniform deposit. When the work is completely covered with copper, reduce the amperage to about 15 to 18 amperes per square foot.

Powdered graphite is very good to use on some articles to be plated, since it permits plating direct in a copper solution. For example, I recently used powdered graphite with good results in plating several eggs. First I applied a coat of floor wax; then I wiped off the excess wax and brushed on powdered graphite with a camel's hair brush until the surfaces were perfectly smooth. I plated these eggs 3 hours.

The thickness of the deposit depends upon the length of time an article is allowed to remain in the copper solution.—A. L. MEDEL.

Tumbling

A short time ago you published a series of articles concerning the tumbling method of application of paint to various sizes and types of products. We shall appreciate your sending us, regardless of the cost which you may have to charge, a reprint of the entire series of articles.—M. P. & V. Co.

Articles wherein several different authors discussed various phases of the tumbling process of finishing appeared in the following issues of INDUSTRIAL FINISHING:

Year	Month	Page
1927	May	22 - 26
1927	Aug.	82
1927	Oct.	70 - 72
1928	June	22 - 24
1928	July	39
1928	Sept.	34 - 40
1929	Jan.	68 - 70
1929	May	96 - 99
1929	Oct.	96 - 97
1930	March	38 - 41
1930	March	48
1930	April	84
1930	May	65
1930	May	85 - 86
1930	June	70
1930	July	76 - 78
1931	Feb.	24 - 28
1931	March	26 - 30
1931	Aug.	24
1931	Dec.	21 - 22
1932	Jan.	38 - 40
1932	March	12 - 16

Boat Finishing

Would you kindly submit specifications for finishing out-board motor boats for use in salt water as well as for lake and river use? The present boats are manufactured of 1-in. grooved-cedar sheathing. The outside is to be enameled to resist salt water or fresh water; the insides are finished with varnish.

Kindly advise what you would recommend on the above. If you can suggest a better kind of lumber, please advise me what kind would be more suitable for taking the finish you suggest.

I am also making cheap row boats and would like for you to

CHROME RACK ENAMEL

When plating with chromium, how do you insulate and protect your Racks to prevent metal deposit?

Chrome Rack Enamel is another specially designed M & W product made for a particular purpose.

It is very easy to apply, dries quickly, and is widely and successfully used. It is not an experiment.

You are invited to write our nearest office for further information.

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Here is the first authoritative handbook of its kind. PRACTICAL JAPANNING and ENAMELING contains much information that has never before been published. You will find between its covers facts, processes, and formulae that have been considered secret by many japanners.

The author has actually been doing this work for others for many years and he knows whereof he speaks. No one has ever gone into the subject of metal finishing more deeply than he nor has the subject ever been explained so clearly and effectively. This book was eight years in preparation.

Color plates and a multitude of tables and illustrations make the text even more clear and understandable. The volume is bound in harmony with its companions of the Practical Finishing Series and makes a rich, attractive appearance. . . 22 chapters.

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Practical Publications, Inc.

802 Wulsin Bldg.
Indianapolis, Indiana

suggest what kind of lumber would stand up for the bottoms and sides. These boats are all 14-ft. long, with sides 16-in. wide, and we are contemplating the use of 1-in. cottonwood for the sides, and cypress for bottoms. Also give us specifications for a cheap finish for the row boats. We must have a two-coat job. What would you suggest?—G. A. W.

For the outside finish I suggest a suitable outside undercoat paint, thinned with about one pint of linseed oil to the gallon of paint. Let this dry 24 hours or more if necessary. Follow with a second coat made up of one-half undercoat and one-half enamel mixed together, the enamel also being a material that is suitable for wood finishing for outside exposure. Let dry 24 hours.

The third and final coat can be straight enamel. The undercoat and enamel materials should be of the same brand and color. Several reputable brands are on the market, and the manufacturers or their representatives will be glad to furnish materials suitable for your purpose.

For the inside finish, I suggest two coats of a good quality spar varnish (preferably a synthetic spar varnish) allowing a drying period of 24 hours after each coat.

For a two-coat job on the cheap boats, I believe you will do well to use two coats of a long-oil durable automobile enamel made on a synthetic varnish base; allow a drying period of 24 hours after each coat.—R. L. Masterson.

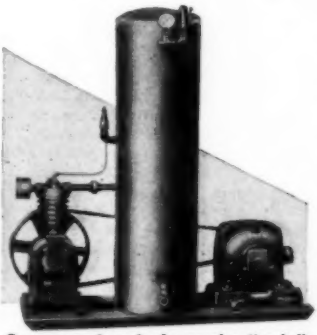
The woods you name in your inquiry are probably all right. We are not so sure about cottonwood, but cedar, cypress, spruce, white pine and yellow pine are commonly used in boat and launch building.—I. W.

New Materials and Equipment

Air Compressor Outfit

The DeVilbiss Co., Toledo, Ohio, announces a new 1-h.p. electric-motor-driven air-compressing outfit for the requirements of the small automobile refinishing shop. This outfit, Type NV, completes the DeVilbiss "V" line of air compressors, which now comprises models ranging from 1 to 5-h.p.

This compressor, a two-cylinder type, has a displacement of over 6-cu. ft. per minute and a working pressure of 80-lbs. It is designed to operate one DeVilbiss Type AV spray



Compact and ready for service "as is."

gun. It is belt driven and equipped with air intake strainer and combination automatic pressure and hand unloader which constantly maintains any desired reserve pressure. It is very compact, being 3½-ft. long and 1½-ft. wide. The compressing outfit is shipped assembled and ready to install, mounted on channel iron skids.

High Pressure Cleaning Device

The Homestead Valve Mfg. Co., Coraopolis, Pa., makes the announcement that its product, "Hypressure Jenny" is an automatically controlled kerosene-fired vapor generator which employs heated water vapor and various cleaning compounds, delivered at high pressure as the cleaning medium. It is widely used in many industries, among its principal applications being the cleaning of floors, windows, building interiors and exteriors, machinery, automotive equipment, airplanes and various parts, and has a record of many successful applications in the industrial field.

Unit Cooler for Factories

Comfort cooling for summer months is becoming as much a requisite in many types of factories as winter heating. The type of system to be installed depends upon a number of factors which are usually individual with the building to be cooled. For instance, running low temperature water through a unit cooler and then using the same water to spray the roof is one method, while the use of a direct expansion refrigerant in the unit cooler may be more economical in other localities.

That the problem of cooling is far

more intricate and exacting than the problem of heating is generally conceded and the leading engineering brains of the heat transfer industry are giving their efforts to this problem.

The field of comfort cooling is growing fast. Manufacturers realize that it means more and better work with but small increase in overhead, and that is the prime requisite for its acceptance.

The Trane Co., La Crosse, Wisc., has adapted its extended surface heat transfer unit, so widely used in the heating and ventilating fields, to the cooling field. Models made by this company include cabinet, suspended and concealed types for various installations.

Comparative Tests Showing

1. Air consumption.
2. Weight of compressed air on surface.
3. Waste of material.
3a. Comparative waste of material.
4. Penetration and adhesion.

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Powdered Metal Polish

In order to meet the present situation and aid their clients in keeping well earned business, Foster D. Snell, Inc., Brooklyn, N. Y., a firm of consulting chemists serving specialty manufacturers, has developed a new metal polish in powder form. This polish is unlike previous powdered polishes in that it has incorporated with it the necessary stabilizing and emulsifying agents to produce a stable suspension when mixed with water. It therefore produces a non-inflammable polish which is said to comply with U. S. Government specifications.

The saving to the manufacturer lies in the fact that the powder can be prepared easily, with a low labor cost, and may be packaged in paper or cardboard containers, eliminating the expense incurred with liquid polishes in packing and shipping water.

The powdered metal polish is sold by the manufacturer to consumers who simply mix the proper proportion of powder with water and they have a liquid metal polish which will stay in permanent suspension and which has all the properties of the best liquid non-inflammable metal polishes.

Ammonium Linoleate

The Glyco Products Co., Inc., Bush Terminal Bldg., No. 5, Brooklyn, N. Y., announces that its product "Ammonium Linoleate" is now being used in certain cases to replace sulfonated oils in making "soluble-oils." When these "soluble-oils" are stirred

into water, they give milky emulsions which find use as polishes, lubricants, textile softeners, agricultural sprays, cutting oils, etc.

The method is simple: Dissolve 15 parts of pure oil in 10 parts of ammonium linoleate and then stir in 5 parts of water. Up to 70 parts of mineral oil is now stirred in to a clear "soluble-oil."

Roxite Spar Varnish

The Norfolk Paint & Varnish Co., Norfolk Downs Station, Atlantic, Mass., announces Roxite Spar Varnish made from 100% pure Bakelite; for exterior and interior use on boats, stairways, standing finish—in fact, wherever a real super varnish is required.

Flexible Lacquer for Brass

The Lacquer & Chemical Co., of 214 Fortieth St., Brooklyn, N. Y., announces that its "Alaka" brass lacquer No. 913 is an extremely cohesive tough finish developed for finishing brass. It withstands severe bending and boiling tests without cracking or loss of adhesion; will not blush in the most humid weather when used with L. & C. Co's. thinner No. 476.

Wood Sizing Material

A new material for sizing veneers and wood turnings has recently been offered to furniture and cabinet manufacturers by The Zapon Co., a subsidiary of Atlas Powder Co., Stamford, Connecticut. It is called, "Zaponite Sizing Liquid."

For many years it has been customary for furniture and cabinet manufacturers thoughout the country to use a thin solution of glue for sizing veneers and wood turnings. This operation is of utmost importance since it smooths the wood and prepares the base for the finishing materials which follow. However, upon the trial of Zaponite Sizing Liquid for the same purpose, it was found that the new material offers a

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A detailed study of modern methods of automobile painting; carefully written in non-technical terms. This book contains much useful information, both for the shop owner and finisher; explaining methods of preventing checking and cracking, water spotting, peeling, chipping, flaking and many other helpful ideas.

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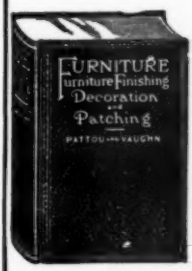

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great many advantages over the old glue sizing solution. It will not raise the grain of the wood; it dries in 30 to 60 minutes; it does not clog the sandpaper; and it gives a much smoother surface to the wood.

Zaponite is handled in about the same manner as the glue sizing solution. It is applied to veneer panels by brush. The turnings are dipped in the liquid immediately after they are removed from the turning machine, dried, and then sanded either by hand or on a sanding machine. The result will be a remarkably smooth surface, especially on the end grain on wood turnings.

Letters

(Continued from page 6)

This often caused "bleeding" of color and a slow but sure deterioration of the bonding media.

Most of the new "water" waxes are free from solvents (although some certain pine or other oils, which are objectionable, because of their solvent action). Two of their other disadvantages are their low water resistance and high alkalinity. Low water resistance results in the breaking of coating when walked on with wet shoes. High alkalinity is detrimental to certain colors and deteriorates the bonding medium and certain flooring bases.

Much research has been done to overcome these faults. There is now being marketed an emulsion of carnauba wax in water under the name of "N R Colloidal Wax A," which dries to a high gloss when properly applied. It is free from solvents and oils, and shellac, and has a very low alkalinity.

"I'm Gonna Put the Sun Back in the Sky!"

Owners of the 26,000,000 automobiles in the U. S., can hasten the return of prosperity by the simple expedient of driving each car an additional 300 miles this summer. Here's how the theory works out statistically:

Increased mileage, 7,800,000,000; increased gas consumption, 466,666,666 gallons; increased outlay for gas, $70,000,000; 300,000 more sets of tires, $16,000,000; car replacement, due to wear and tear, 156,000 cars; car replacement cost—average prices, $156,000,000.

All told, the trifling 300 miles would involve additional buying, close to $250,000,000.

Add to this the incidentals that go with the enlarged use of everybody's car and the picture is a pretty one. Here's how YOU fit into it:

Take an occasional 10 mile trip "off the main highway"; get better acquainted with some of the prospects you seldom see, and you'll help to "Put the Sun Back in the Sky" for a lot of people, including yourself.—Hilo Varnish Corporation.

Terechrome Finish

We have a request for a grey Terechrome finish on oak furniture. We are at a loss to know just what this finish is, and any information you can give us on it would be greatly appreciated.—T. K. F. Co.

Antique Maple Stain?

Will you kindly advise us what kind of stain we can use on sap gum wood veneer to produce a regular antique maple finish as now used on bedroom furniture? We have endeavored to work this out in our finishing department, but so far have been unsuccessful. We would appreciate your advising us just how this antique maple is produced for quantity production.—T. O. W. F. Company.

Editor's Note: See the article about "Maple Wood Finishes," pages 24 and 26, March issue.

Gilt Edge Playing Cards

We are experimenting with gold bronze and aluminum powder for finishing the edges of our playing cards, but so far, we have been unsuccessful in getting it to lay smooth and show a high sheen when finished.

We would like to know if some manufacturer who makes a specialty of same has devised a vehicle and a method of getting just the finish we want—or you may be able to get us in touch with the right source of supply for information.—U.S.P.C. Co.

Nail Hole Filler

In the June issue, we notice an item relative to "Nail Hole Filler." You answered by stating that one of the finish manufacturers advertising in the magazine offered this material, but we fail to find any reference to it, and thought possibly it was in a previous issue that we had missed. Please send us the name of the manufacturer so that we can secure information relative to this material.—S. C. & C. Co.

Your Influence put into print

SOME of your own ideas about what INDUSTRIAL FINISHING'S reading pages should contain, to help you now and in the future, can be expressed at this time.

This journal is designed especially to suit your professional requirements, and the editor wants to know what information you desire, what problems or difficulties you have and how we can assist you. It costs you nothing to make inquiries or to name subjects you wish to see discussed.

Every man occasionally feels prompted to "cut loose" and write some of his own experiences, opinions or ideas. INDUSTRIAL FINISHING solicits letters, criticisms and articles from practical and technical men.

Suggest any subjects you would like to see taken up by articles in the publication, or tell us what subjects you are in position to write about for publication. Address—

INDUSTRIAL FINISHING, 802 Wulsin Bldg., Indianapolis, Ind.

I am particularly interested in articles on

I might write you something on

Name .....

Position .....

Company .....

My Address .....

Plastic Rough Finish

We have at hand the INDUSTRIAL FINISHING magazine for April, 1932 and we are very much interested in the article on page 10. We have been doing this work in New Zealand for the past 18 months with the exact equipment you illustrate on page 13. We have achieved great success with this finish here. The only trouble we have is drying time, and we would esteem it a favour if you could put us in touch with some Plastic Mfrs. If possible, instruct them to send us per parcel post one quart, and, if any payment is required for the samples, they can draw on us through the National Bank of New Zealand, Te Aro Branch, Wellington. We would also be pleased to receive any dope they have on their finishes.—Boulcott Spraying Co., Boulcott St., Wellington, New Zealand.

Represents Day & Co. in Mich.

Mr. Chas. B. Pearson is now representing James B. Day & Co., Chicago, in the state of Michigan. He will have headquarters in the McMullen Building, Grand Rapids. Mr. Pearson has had considerable practical experience as well as thorough training in sales work. He is well qualified to make recommendations for complete finishes on a wide variety of products.

Gilbert Spruance Recovering

Gilbert Spruance, President and General Manager of The Gilbert Spruance Co., of Philadelphia, is reported as recovering from a serious major operation he was forced to undergo recently. The operation was performed in the Jefferson Hospital of Philadelphia and it is thought complete restoration to health is but a matter of time.

Spray Data Test

The Eclipse Air Brush Co., 79 Orange St., Newark, N. J., has issued an 8½x11-in., 13 page, illustrated booklet entitled "Comparative Spray Painting Tests" and identified as Data Folder HD-6270. This booklet contains interesting information about comparative tests in the application of liquid coatings and finishes with compressed air. These tests are classified as: (1) air consumption test, (2) weight of compressed air on surface, (3) waste of material, (3a) comparative waste of material, (4) penetration and adhesion.

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